Gas Law Problems: Practice Test

1. State Boyle’s law and explain what it means.

Also include an explanation of each of the variables and a graph representation of this law including units.

Explain the law as it relates to the kinetic molecular theory.(Ex: why does a balloon inside a vacuum pump increase in size when the pump is turned on?)

2. State Charles’s Law and explain what it means.

Also include an explanation of each of the variables and a graph representation of this law including units.

Explain the law as it relates to the kinetic molecular theory. (Ex: why does an aerosol can explode when it is left in a car during the summer on a hot day?

For the following, perform the calculations and decide which gas law each problem represents.

3. The volume of a gas is 1164 ml at 18C . What is its volume at standard temperature? (1092 ml)

4. Some oxygen occupies 250 ml when the barometer reads 100 kPa. How many kPa will it occupy when the volume is reduced to 240 ml? (104.17 kPa)

5. What volume must be maintained to ensure that 2.1 atm of a 0.75 mole gas at

-10 is stable? (7.71 L or dm3)

6. What is the ratio of the speed of hydrogen molecules to that of oxygen molecules when both gases are at the same temperature? (Remember that both are diatomic molecules) (3.98 : 1)

7. A gas collected when the temperature is 20and the pressure is 200 kPa measures 425 ml. Calculate the volume at STP. (781.62 ml)

8. Calculate the mass in grams of 5 liters of ammonia at STP. (3.80 g)

9. A gas is at 27 and 756 mm Hg. What will the pressure be if the temperature is raised to 500 under constant volume? (1947.36 mm Hg)

10. Explain and draw a manometer when the mercury level in the tube is 12 mm higher inside than that outside? The air pressure outside reads 720 mm. What will be the pressure of the gas inside the manometer.

11. The volume of oxygen in a eudiometer is 40 ml. The mercury level inside the tube is 25 mm higher than that outside. The barometer reading is 750 mm. The temperature is 24°C. What will be the volume of the oxygen at STP?

12. A gas is being collected by water displacement. The volume of a gas in the eudiometer is 20 ml. The level inside the tube is 15 mm higher than that outside. The barometer reads 725 mm. The temperature is 5°C. What will be the new volume at 10°C and 740 mm.

Think questions using the kinetic molecular theory:

1. Why do you need to bake a cake for a longer period of time or at a higher temperature when you are at high altitudes, like Denver, Colorado?

2. How does a pressure cooker work?

3. Why do scuba divers need to be careful when they are resurfacing from deep in the ocean?

4. Why does a helium balloon pop when it is let go and goes up in the sky?

5. Why do they say not to put an aerosol can in a closed car in the summer time?

6. What allows you to suck up a liquid with a straw?

7. What allows you to be able to ice skate?